Business as Unusual

Leveraging the Water Supply Planning Process to Create Economic Opportunity, Enhance Environmental Integrity and Increase Regulatory Certainty

What We Do

- Gather and synthesize state-wide water supply plan data:
  - Needs (drinking, agricultural, industrial)
  - Existing Sources (lakes, streams, wells, springs)
  - Proposed Supplementary Sources
- Evaluate the cumulative impacts of projected water withdrawals, discharges, diversions and impoundments on:
  - Off-stream uses: existing permits, grandfathered uses
  - Instream uses: aquatic life, assimilative capacity, physical properties, chemical properties
  - Downstream withdrawals/discharges

Why Do We Do It?

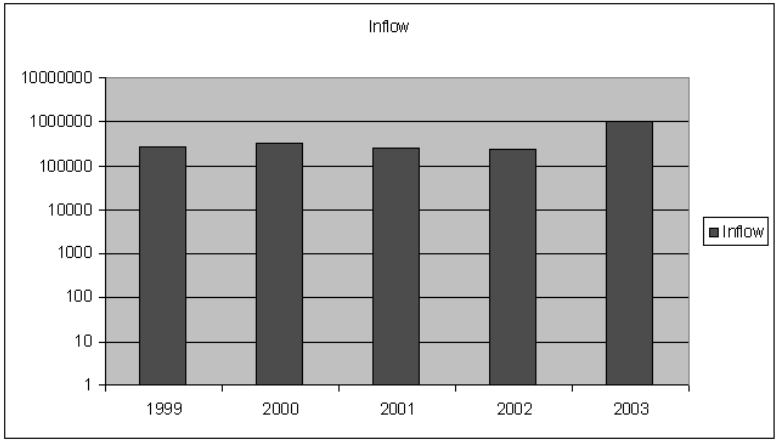
- Increase certainty (decrease uncertainty)
- Enhance Environmental Integrity
- Create economic opportunity
- In general, we want to move beyond:
  - Overestimate of demand as the only MOS
  - Lack of information about upstream changes, and downstream effects
  - Narrow range of alternatives due to cost of alternatives evaluation
  - Quantity and Quality un-related

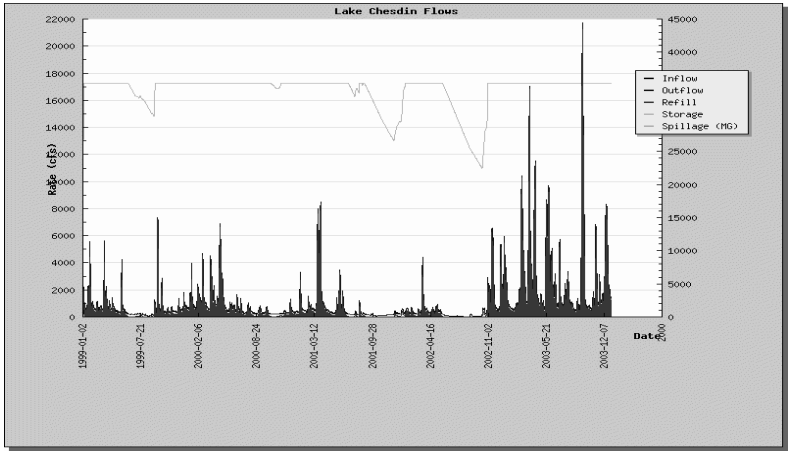
(Un)Certainty and Economics

- Water availability influences growth
- Budgetary constraints influence our ability to monitor, and therefore, model and make decisions
- Rational versus adaptive expectations – water supply plans
  - Water Supply Planning horizon is 30 years, updated every 5 years
- Regulatory uncertainty makes planning more costly

What We Do: Modeling Surface water flows

- Quantity
  - Annual Inflows
- Timing
  - Daily, monthly, seasonal inflow
- Storage
  - Reservoir storage available (crucial!)
- Drought Response



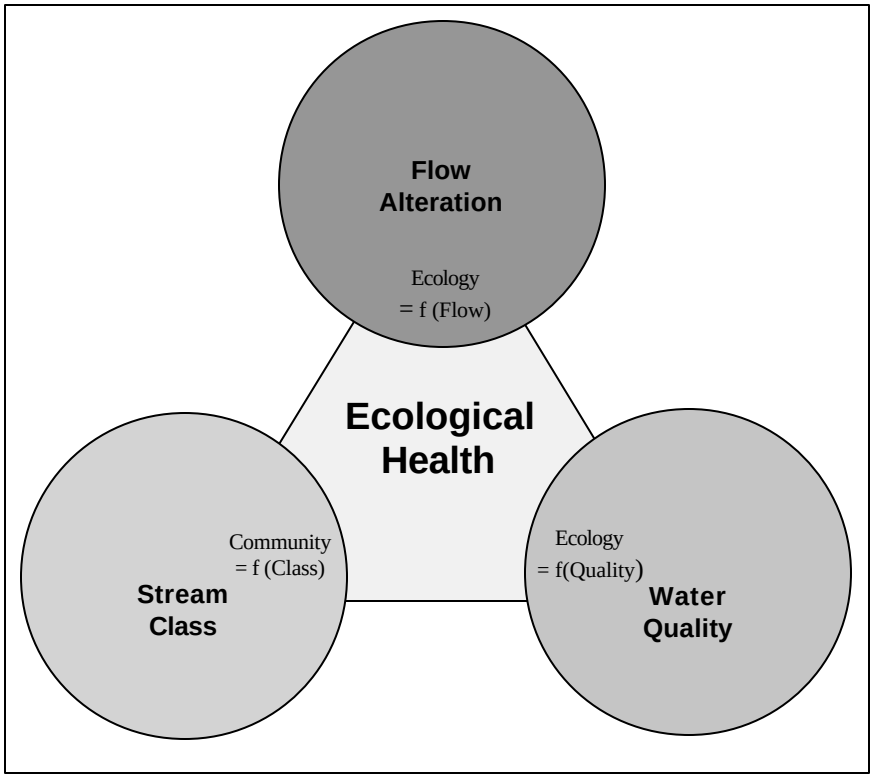


How We Do It: Decision Support System

- An integrated “meta-modeling” and data analysis system
- Provides Integrated Data Acquisition, Analysis, and Modeling
  - Connect to web-based data sources with automated retrieval
  - Utilize internal DEQ databases, such as VPDES and VWUDS
  - Integrate data with hydrologic modeling software for long-term impact analysis and short-term prediction
- How:
  - Leverage Existing Web-Based Data Sources
  - Make in-house data sources web accessible
  - OO System for integration of models and data
  - Continually update model with recent permit decisions
- Status:
  - All permits issued/reissued since Spring 2009 in state-wide model (17)
  - Approved WS Plans being programmed into modeling system as of Summer 2010

Ecological Health Modeling System

- **Lack** of comprehensive Flow-ecology model **increases regulatory uncertainty**
- Main Drivers of Ecological Health:
  1. Native/Naturalized Community (stream class/location dependent)
  2. Extent of detrimental flow alteration
  3. Water Quality
- Without knowing all three of the above, we face greater (sometimes *unacceptable*) uncertainty
- Construction of state-wide "Flow-ecology" model in the works

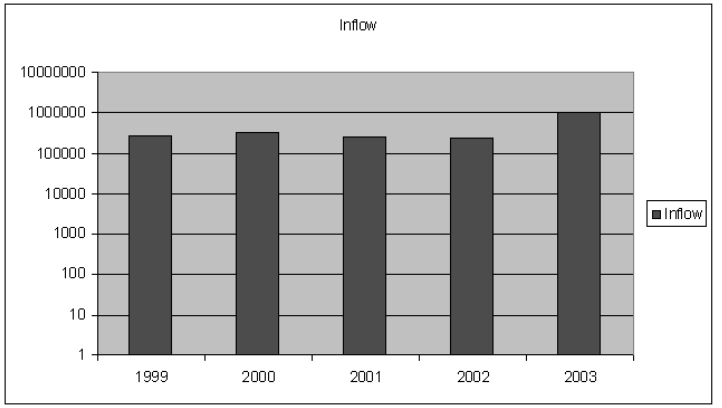


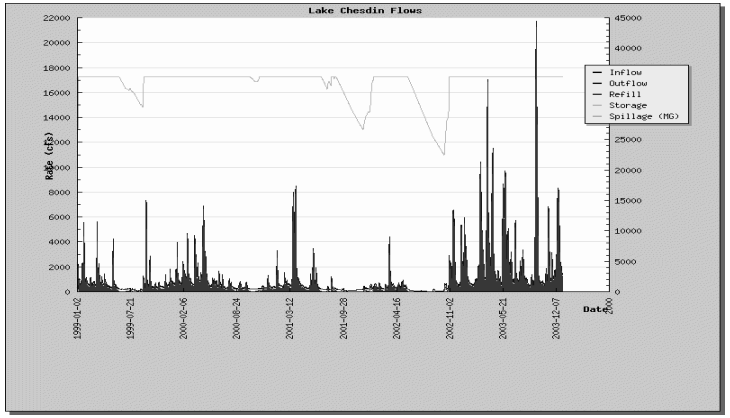
Drought Response and Conservation

- Drought Response – decreasing non-essential demands during drought increases certainty for essential demands
- Conservation – Increasing efficiency of essential uses during non-drought times increases availability of water for all users (including in-stream resources)

Questions that we can ask …

- Are there alternatives in water supply plans that are preferable?
- How will future land use build-out affect downstream water supplies (availability, timing, cost of treatment)?
- If temperature and precipitation patterns change, what happens?
- What are the effects of all of these things on: aquatic life, recreation, water quality?
- What effect will drought restrictions have? (by use type, and season?)
- Does a water allocation upstream affect dilution/DO/temperature downstream?
- All of these in terms of: availability, aquatic life, recreation, and quality.





Perceived Data/Analysis Gaps

- Extent of grandfathered water use
- Inter-basin transfers (within a system)
- VPDES data for withdrawals
- The limits of conservation ordinances and low-hanging fruit
- Understanding historical surface and groundwater use impacts on stream flows
- The magnitude of agricultural water use
- The consumptive nature of all uses
- Impact of groundwater withdrawals on base flows (short term and long term)
- Flow-ecology relationships need to be fleshed out state-wide (under way)